Claims

1. A method to control an overactive bladder and to estimate bladder volume, comprises: an implanted sensor, which sensor comprises at least one nerve electrode to sense electrical signals,

means for stimulation of nerves to inhibit detrusor contraction,

an electronic unit to detect events from nerve signals and generate electrical pulses for stimulating nerves,

characterized in,

that stimulation is only applied when a bladder contraction occurs,

that the implanted sensor comprising at least one nerve electrode to sense electrical signals from nerves innervating the bladder,

said method comprises the step of:

a) sensing electrical signals related to mechanical bladder activity via said sensor,

b) detecting the onset of a bladder contraction and estimation of bladder volume using signal processing methods,

c) activating an inhibitory spinal reflex by stimulating afferent nerve fibres, in response to detection of the onset of a bladder contraction,

using a closed loop stimulation system to allow event driven inhibition of the bladder.

2. A method of claim 1, **characterized in,** that detected nerve signals primarily comes from afferents innervating mechanoreceptors located in the bladder wall,

3. A method of claim 1 or 2, **characterized in** that the step of implanting a sensor comprises the step of implanting a nerve cuff electrode.

4. A method of one of the claims 1-3, **characterized in,** that the step of implanting a sensor comprises the step of implanting a intrafasicular electrode.

5. A method of one of the claims 1-4, **characterized in,** that the electrodes is used to detect efferent or afferent nerve activity.

6. A method of one of the claims 1-5, **characterized in,** that the electrode is placed on a nerve that contains afferent nerve fibres innervating mechanoreceptors located in the bladder.

7. A method of one of the claims 1-6, **characterized in,** that the electrode is located at the intradural or extradural dorsal sacral nerve roots.

8. A method of one of the claims 1-5, **characterized in,** that the electrode is placed on a nerve that contains efferent nerve fibres innervating the bladder.

9. A method of one of the claims 1-5 and 8, **characterized in,** that the electrode is located at the intradural or extradural ventral sacral nerve roots.

10. A method of one of the claims 1-5 and 6 and 8, **characterized in**, that the electrode is located at least one of the preganglionic pelvic nerve branches or postganglionic nerve branches.

11. A method of one of the claims 1-10, **characterized in**, that 2 different nerve signals is used to detect a detrusor contraction, where the first signal comes from afferent nerves innervating the bladder, and the second signals comes from efferent nerves innervating the detrusor muscle.

12. A method of one of the claims 1-11, **characterized in**, activating neural circuits that inhibit bladder contraction by activating an inhibitory spinal reflex by stimulating afferent nerve fibres, innervating mechanoreceptors located in the glans of the penis or clitoris.

13. A method of claim 12, **characterized in**, that the stimulation electrode is located at a dorsal penile/clitoris nerve, or a pudendal nerve, or a extradural sacral nerve root or a intradural dorsal sacral nerve root.

14. A method of one of the claims 1-13, characterized in, that the bladder volume is derived from the amplitude of the recorded nerve signal.

15. A method of one of the claims 1-14, characterized in, that the bladder volume is derived from the time between 2 consecutive detrusor contractions.

16. A method of claim 14 or 15, characterized in, that the bladder volume is derived form both the amplitude of

the recorded nerve signal and the time between 2 consecutive detrusor contractions.